

PATENT SPECIFICATION

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COMPLETE SPECIFICATION

Device for Indicating the Consumption of the Salt Filling in a Container Having Water Flowing Therethrough

We, ROBERT BOSCH HAUSGERÄTE GMBH., a German Company, of 4, Breitscheidstrasse, Stuttgart, Germany, (Assignee of ROBERT BOSCH GMBH.), do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The invention relates to a device for indicating the exhaustion or near exhaustion of the salt filling of a container having water flowing therethrough at least periodically. The salt in such container may serve for regenerating an ion exchange water softener used in conjunction with a dish-washer or washing machine.

Hitherto, in order that the salt content may be checked, the lid of the container had to be unscrewed periodically and the supply of salt determined by looking into the container. As this is troublesome it is frequently not carried out at the right time, so that the exhaustion of the salt supply is discovered only when a deposit of lime begins to settle on washed dishes.

This disadvantage may be overcome if, in accordance with the invention, a source of light is mounted on the container and a beam of light from the source of light is directed into the container towards a window provided in another position on the container, so as to be visible therethrough when salt located in the path of the beam between the source of light and the window has been dissolved by water flowing through the container.

In this way exhaustion or near exhaustion of the salt supply can be easily detected from outside the container without handling it, so that a dish-washing machine attendant can be reminded to replenish the supply of salt at the right time.

The invention will be further described by way of example with reference to the accompanying drawings in which:—

Fig. 1 is a part section of a salt container having a source of light in its base and a window in its lid,

Fig. 2 is a detail section of another container having a source of light in a water inlet connecting piece arranged at one side of the container, and a window in a water outlet connecting piece disposed at the opposite side,

Fig. 3 is a section of another container having a source of light in a water inlet connecting piece, and a mirror arranged in the container for deflecting a beam of light to a window located in its lid.

The salt container 1 of Fig. 1, arranged in a suitable manner in conjunction with for example a dishwashing machine, has in its base 2 a source of light from which a beam of light is concentrated by a lens 4 and projected towards window 5 in a lid 6 of the container 1. In order that the beam of light coming from below may be more easily perceived, the window 5 may also have a lens-like construction. A water pipe 7 extends through the container 1 so that fresh water is fed into one side of the salt container and withdrawn from the other side, to, for example, an ion exchange water softener (not illustrated).

As long as there is salt in the container 1, the beam of light from the source of light cannot penetrate to the window 5. The beam of light may pass through the water and be perceived in the window 5 only when the salt has been washed from the container 1, or the residual salt is dissolved by the water in the container. Thus, indication is given that the supply of salt in the container 1 is ex-

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hausted or nearly exhausted and requires replenishment.

In the embodiment of Fig. 2, a fresh water inlet connecting piece 8 of transparent material is arranged in one side wall of the container 1 near the base 2 thereof, and a distributor piece 9 also made of transparent material is connected downstream of the connecting piece 8. An incandescent lamp 11 serving as a source of light is accommodated in an attachment 10 to the connecting piece, and a focusing lens 12 is arranged in the end of the distributor piece 9 nearest to the connecting piece 8. The end of the connecting piece nearest to the inside of the container 1 is closed and has a plurality of slotted jets 13 for the inflow of the fresh water into the container 1. A connecting piece 8' for the salt water outlet is provided on the opposite side wall of the container, and contains a window 14. Not only the window 14, but the entire connecting piece 8' may be made of transparent material. A distributor piece 9' having a focusing lens 12', and having slotted jets 13' for the outflowing salt water, is provided on the connecting piece 8'.

Here, as soon as the salt has been washed from the container, or the residual salt has been dissolved by the water, the beam of light from the lamp 11 can pass through the wall of the transparent connecting piece 8, the lens 12 and the slots 13, on the one side, and, on the other side, through the slots 13' and the lens 12' to the window 14, thus indicating that the salt filling is exhausted or nearly exhausted.

In the embodiment of Fig. 3, the parts basically identical to those of Fig. 2 are provided with the same reference numerals. The difference in comparison to Fig. 2 is, in the first instance, that in Fig. 3 the distributor pieces 9'' and 9''' are open towards the interior of the container and are connected to each other by a pipe 15. The pipe contains a mirror 16 which deflects the beam of light from the source of light 11 towards the lid 6 through a transparent portion 17 of the pipe 15, the lid being provided with a window or being of transparent construction. The transparent portion 17 is provided with a small aperture 18 through which a small quantity of water may flow from the pipe 15 into the container, so that the transparent portion 17 may not be made opaque by sedimentation. In contrast to Fig. 2, the example of Fig. 3 is not provided with a focusing lens in the distributor piece 9''', and the connecting piece 8'' for salt water outlet has no window and may comprise a simple pipe connecting piece of non-transparent material.

In the example of Fig. 3, as soon as the supply of salt in the container is exhausted or nearly exhausted, the mirror 16 can deflect the beam of light through the transparent

portion 17 to the lid 6 where they become visible and indicate that the salt supply is exhausted or nearly exhausted.

In all three embodiments, exhaustion or near exhaustion of the supply of salt is readily perceived by virtue of the automatically operating indicator. Preferably, the source of light is switched on by a door switch and lights up as soon as the door of the dishwashing machine is opened.

WHAT WE CLAIM IS:—

1. An ion exchange apparatus with means for regenerating with salt solution in which a salt holding container incorporates a device for indicating exhaustion or near exhaustion of the salt filling of the container having water flowing therethrough at least periodically comprising a source of light mounted on the container such that a beam of light therefrom can be directed into the container towards a window provided at another position on the container so as to be visible therethrough when salt located in the path of the beam between the source of light and the window has been dissolved by the water flowing through the container.
2. An apparatus as claimed in claim 1 in which the source of light is arranged at the base of the container, and the window on the filler lid of the container.
3. An apparatus as claimed in claim 2, in which a lens for focusing the beam of light is provided at or near the source of light and/or at or near the window.
4. An apparatus as claimed in claim 1 or 3, in which the source of light is arranged on one side wall of the container near the base thereof, and the window is arranged at a position of a side wall at a distance from the source of light.
5. An apparatus as claimed in claim 4, in which the source of light is arranged in a water inlet connecting piece, and the window in a water outlet connecting piece of the container.
6. An apparatus as claimed in claim 1 or 3, in which a mirror is arranged in the container in the path of the beam of light from the source of light, for deflecting the beam of light to a window offset from the direction of the beam of light.
7. An apparatus as claimed in claim 6, in which a mirror for deflecting the beam of light to the window through a transparent portion of a pipe is located in the pipe which is arranged in the container in the path of the beam of light from the source.
8. An apparatus as claimed in claim 7, in which the transparent portion has an aperture for the outlet of fresh water.
9. An ion exchange apparatus with means for regenerating with salt solution in which a salt holding container incorporates a device for indicating exhaustion or near exhaustion

of the filling of a container constructed and arranged substantially as hereinbefore particularly described with reference to and as illustrated in Fig. 1 or Fig. 2 or Fig. 3 of
5 the accompanying drawings.

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Fig. 1

Fig. 1 is a schematic diagram of a mechanical device, likely a pump or valve assembly. It features a central vertical shaft (5) passing through a housing (2). The shaft is connected to a rotating component (4) at the bottom. A control lever (3) is attached to the shaft near the bottom. A valve or plug (6) is located at the top of the shaft. A small circular component (7) is visible on the side of the housing near the bottom. The device is shown in a cross-sectional view.

Fig.3

